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| 10/619,613 | 07/16/2003 | Moo Ho Bae | 240366US2 | 6530 |
| 22850 | 7590 | 05/04/2007 | | |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | |
| | | | EXAMINER WEI, YAN-ZHEN | |
| | | | ART UNIT 3768 | PAPER NUMBER |
| | | | NOTIFICATION DATE 05/04/2007 | DELIVERY MODE ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/619,613

Applicant(s)

BAE, MOO HO

Examiner

Yan Wei

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>8/23/04, 6/5/06</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

1. Claims 1 and 3 recite the limitation "said multiplexed signal" in ii). There is insufficient antecedent basis for this limitation in the claim. The examiner interprets the statement as the "multiplexed ultrasound signal". Appropriate correction is required.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 4-5 of U.S. Patent No. 6494842 in view of U.S. Patent No. 5345426 to Lipschutz Fig.3 since in this alternative embodiment multiplexers 102, 110 accept data channels C, D for fine delay and then gain compensation in 184, 188.

4. Claim 1 is also rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 4-5 of U.S. Patent No. 6494842 in view of U.S. Patent No. 5623928 to Wright et al. In Wright et al the col. 21 – 22, the line replication of parallel multi-line acquisition is performed using time-multiplexing and with the phase alignment correction compensation of col. 22 lines 51 - 65. Additionally, this entire modular channel architecture is subordinate to the multiplexer-based selection in 4 of the active sub-aperture for which all of this will occur (see fig. 4A upper half path and col. 21 discussion).

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention:

(A) By referring to the applicant's previous patents, it indicates that the current application is in fact a parallel beamformation or multiple beamformer or 'multi-line acquisition system. The application states the term in a void, para [0016] lines 3 - 6 such that it can mean anything including the basic imaging itself.

(B) The terminology containing "beamform" does not appear in the application. So one is not being told, nor can one ascertain from single Fig. 1 that lacks connection to any array, whether the invention is a part of or how it relates overall to beamformation.

(C) There is no indication as to how or whether the clocking controls to the FIFOs from FDCU 28 control the input multiplexers 21 which they must do.

(D) Exemplary pulse timing diagrams are wholly lacking.

(E) By having five stages of delay FIFOs (first-in, first-out registers) and no explanation of why 5 are needed, one is left to guess in a way that leads to an incomplete or improper understanding.

(F) One can parallel- beamform at a number of locations during receive. After the abstract and para [0003] in the application, the term 'transducer' is never again used, and 'element' where used does not pertain to the same. Accordingly the multiplexer

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relationship to the transducers is never established in relation to the preferred embodiment.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1 and 3-5 are rejected under 35 U.S.C. 102(b) as being anticipated by US patent #5345426 to Lipschutz.

Lipschutz teaches the use of multiplexers (i.e. numerals 102 and 106 in Fig.3), analog-to-digital converters (Numeral 20_n in Fig.1), delay interpolators (Numeral 24_n in Fig.1) each comprising a FIR digital filter (column 5, lines 5-9), and means for digitally processing and compensating multiplexed signals outputted from a bit shifter (numeral 108 in Fig.3) in a multi-channel, parallel beam-formation receiving-focusing ultrasound apparatus (Fig.1 –Fig.3, column 4, lines 67-68 and column 5, lines 1-4). Lipschutz further teaches a preferred embodiment of implementing components of the apparatus in an applications specific integrated circuit (Column 8, lines 61-64).

9. Claims 1-3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by US patent #5905692 to Dolazza et al.

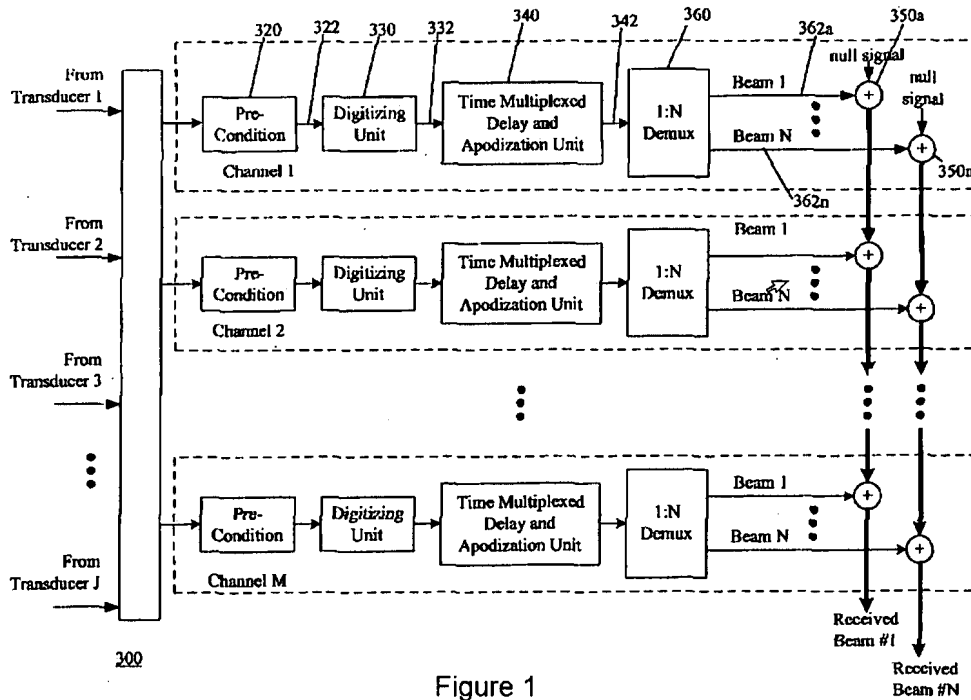


Figure 1

Dolazza et al. teach an ultrasound beam-former including M processing channels and J (less than M) transducer elements arranged in parallel, as shown in Figure. 1 of this office action. Each channel uses part of the switching network 300 as an analog multiplexing means to process signals from a plurality of transducers, and employs digital processing and compensating means comprising a preconditioning unit with filtering functions (Column 6, lines 11-19), a digitizing unit, a time multiplexed delay and apodization unit (Column 4, lines 16-35).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lipschutz as applied to claim 1 above, and further in view of Dolazza et al.

Lipschutz teach all the elements of the current invention except for using an analog multiplexer. In the same field of endeavor, Dolazza et al. teach an ultrasound beam-former including M processing channels and J (less than M) transducer elements arranged in parallel, as shown in Figure. 1 of this office action. Each channel uses part of the switching network 300 as an analog multiplexing means to process signals from a plurality of transducers. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teaching of Lipschutz to employ analog multiplexer in order to allow the system to have fewer processing channels than transducers, so that a set of processing channels can sequentially process signals of transducers from multiple regions of the transducer array (Column 2, lines 31-35).

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dolazza et al. as applied to claim 1 above, and further in view of Freeman et al.

Dolazza et al. teach all the elements of the current invention except for the application of an Application Specific Integrated Circuit. In the same field of endeavor, Freeman et al. disclose that an ultrasound imaging system uses a large collection of Application Specific Integrated Circuits (Column 1, lines 37-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teaching of Dolazza et al. and embed the plurality of channel modules as an Application Specific Integrated Circuit in order to establish the apparatus as a part of a state-of-the-art ultrasound image system (Column 1, lines 37-42) for faster signal processing.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kino et al. (US 4325257 A) teach a real-time digital, synthetic-focus, acoustic imaging system.

Paul D. Corl (US 4974211 A) teaches a digital ultrasound system with dynamic focus.

Thomas L. Deitrich (US 5520186 A) teaches Method and apparatus for controlling transducer multiplexing in ultrasound imaging system.

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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yan Wei whose telephone number is (571) 272-5356. The examiner can normally be reached on 9am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on (571) 272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

yw


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